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WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Distribution and Source Determination of Fecal Coliform in the Long Term Watershed

Duration: April 1, 1999-March 31, 2000

Fiscal Year 1999 Federal Funds:

- Total: $14,948
- Direct: $14,948
- Indirect: $0

Non Federal Funds:

- Total: $30,153
- Direct:$18,706
- Indirect: $12,047

Principal Investigators: Dr. James Moore, Professor and Head, Department of Bioresource Engineering, Oregon State University Dr. John Botte, Associate Professor, Departnicat of Bioresource Engineering, Oregon State University

Congressional District: Oregon 5th

Critical Need for Research

Fecal coliform distribution is a major issue for determining possible human health issues in stream and reservoir use and in allocating watershed restoration activities in the watershed. The diversity of uses and the extensive recreational utilization of the Long Tom watershed make the identification of distribution and sources of fecal coliforrn important. 'Me Long Tom watershed includes a substantial portion of the City of Eugene, the second largest city in Oregon. It contains the Fem Ridge Reservoir, which sees the highest recreational use hours of any freshwater body in the state.

Despite the heavy recreational and resource use of this watershed, both the distribution and sources of fecal coliform in this watershed have received relatively little study and are largely unknown. The Oregon Department of Environment Quality has done some sampling within the watershed, resulting in several stream segments within the Long Tom watershed being placed on the 303D list for several parameters (see Table 1). This proposal will address three of the listing criteria: fecal coliform bacteria, water temperature, and dissolved oxygen. This proposal will collect data that will serve to strengthen the baseline data set for both the listed streams segments, as well as provide datasets for previously unsampled reaches.

The proposed work will additionally provide further evaluation of the effectiveness of antibiotic resistance screening as a tool for discriminating sources of fecal coliform (Parveen, et al., 1997; Moore and Bower, 1998.) Identifying coliforin sources is critical in determining effective remediation and restoration strategies, and is of high interest to many watershed councils and other groups interested in watershed improvement. Further,.the exploration of possible relationships between land uscaand cover and distribution of fecal coliform strains may provide additional insights in restoration activity prioritization. Because land uselland cover patterns are diverse in the Long Tom, with portions of the watershed heavily used for agriculture, and others dominated by urban and rural residential use, it is an excellent study area for exploring these relationships.

Expected Results, Benefits, Information

The proposed research should identify areas within the watershed which are experiencing fecal coliform contamination or other water quality-limiting conditions, and demonstrate methodologies for identifying specific source classes for fecal colifonns. This will benefit watershed councils and other stakeholder groups involved in watershed restoration efforts. The - infbrmation generated will be presented to the Long Tom Watershed Council for their review and discussion, and be used in an ongoing related project to assist the council in allocating restoration activities.

Goals and Obiectives

The goals and objectives of the proposed research are:

1) Identify water quality-limiting factors (fecal colifom temperature and dissolved oxygen) iat fourteen sites within the Long Tom watershed.

2) Evaluate the effectiveness of an antibiotic resistance source discrimination methodology for fecal coliforms.

3) Relate the results of the source discrimination procedures to land use/land cover datasets through spatially-explicit analysis procedures.